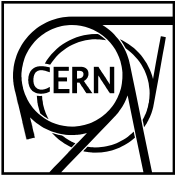


CERN

CH1211 Geneva 23
Switzerland



EDMS NO.

1406764

REV.

1.1

VALIDITY

Released

REFERENCE

SAFETY

Date : 2014-09-02

Safety Document

Local Access Restrictions in LHC below 80 K or during flushing with Helium

Abstract

This document defines the authorisation chain for work in areas with an accrued risk of Helium spillage once the accelerator and QRL are filled with liquid Helium

DOCUMENT PREPARED BY:

Laurent Tavian, TE-CRG
Thomas Otto, TE-HDO (DSO)

DOCUMENT CHECKED BY:

J. Miguel Jimenez, TE
Benoit Delille, DG-DI-DAT

DOCUMENT APPROVED BY:

F. Bordry, DG-DI-DAT



HISTORY OF CHANGES

REV. NO.	DATE	PAGES	DESCRIPTIONS OF THE CHANGES
0.1	20.8.2014	All	Very first draft for comments
1.0	26.8.2014	1,3,4	<ul style="list-style-type: none"> - Title changed - authorisation criteria completed - "Other Hazards" disclaimer added and role of supervisor reinforced
1.1	2.9.2014	5-8,Annexes	Updated 6.1, 6.6, 6.8 and annexes 1, 6, 8

TABLE OF CONTENTS

1.	Introduction.....	3
2.	Areas with Sensitive Cryogenic Instrumentation	3
3.	Authorisation for work.....	3
4.	Other Hazards.....	4
5.	Role of the Supervisor.....	4
6.	Identification of sensitive areas	4
6.1	Sensitive areas in Sector 1-2	5
6.2	Sensitive areas in Sector 2-3	6
6.3	Sensitive areas in Sector 3-4	6
6.4	Sensitive areas in Sector 4-5	6
6.5	Sensitive areas in Sector 5-6	6
6.6	Sensitive Areas in Sector 6-7	7
6.7	Sensitive Areas in Sector 7-8	8
6.8	Sensitive Areas in Sector 8-1	8



1. Introduction

The LHC Access Matrix restricts access to the LHC tunnel depending on the cryogenic state of the accelerator and the QRL.

Once the temperature of the accelerator is below 80 K or flushing with Helium is in progress, the following work requires specific authorisation:

- Work on the QRL side of the accelerator, requiring crossing a magnet
- Work in areas with sensitive cryogenic instrumentation

This document defines the authorisation chain for work in these areas.

2. Areas with Sensitive Cryogenic Instrumentation

Areas with sensitive cryogenic instrumentation contain particularly fragile cryogenic instruments on either the accelerator or the QRL, which, when damaged, could lead to a spill of liquid helium with a mass flow not exceeding 100 g s^{-1} .

Sensitive areas are located

- On and around DFBs
- On and around standalone superconducting magnets.
- Around Cryogenic Interface Modules ("Jumpers")

A pictorial guide to areas with sensitive cryogenic instrumentation is given in the annexes for each sector.

3. Authorisation for work

An exceptional authorisation for work on the QRL side or in areas with sensitive cryogenic instrumentation is given by the Complex Manager (Director for Accelerators and Technology) via the TE DSO.

The work for which authorisation is sought must be sufficiently justified (e.g. unacceptable risk for safety or environmental protection, unacceptable impact on the function of the accelerator).

The request for authorisation must be accompanied by

- A detailed description of the work to be performed
- The location(s) where the work is performed, with as much detail as possible
- A nominal list of participants in the activity
- The duration of the work to be performed

The request for authorisation is addressed to the Complex Manager via the DSO of the TE department, who will perform a risk assessment with the requestor and an expert of cryogenic instrumentation.

The IMPACT system shall be used for the request for authorisation.



4. Other Hazards

This document gives an exhaustive listing of sensitive cryogenic instrumentation to the best knowledge of the authors. Other instrumentation may be accidentally damaged during interventions and cause significant down-time of the accelerator.

5. Role of the Supervisor

Once authorised, the supervisor for the work executed makes sure that all personnel intervening

- Know the location of sensitive cryogenic instrumentation
- Have been informed of the risks entailed by damaging this instrumentation
- Know how to react in case of an accidental Helium spill (self-rescue mask and evacuation).

In any case where personnel are not certain about the course of action to take during the work, they shall report back to their supervision. LHC Coordination, Safety Officers and experts from instrumentation groups will assist in devising the safest strategy of accomplishing work.

6. Identification of sensitive areas

The following tables list the sensitive areas for He-spill in the LHC with their coordinate (DCUM), starting from sector 1-2.

Drawings of the sensitive areas, indicating precisely the sensitive elements with a red circle, are given in the Annexes 1 to 8 (in eight extra files).



6.1 Sensitive areas in Sector 1-2

DCUM (LHC Coordinate)	Closest magnet Subsector	-	Equipment identification
55	R1		DFBXB
172	D2Q4R1		DS
200	Q5R1		DFBM
231	Q6R1		DFBM
250	R1		DFBAB
250	RR17		DFBLB
340	Q9R8		BA module
541	Q13R1		AA (jumper)
755	Q17R1		AA (jumper)
969	Q21R1		AA (jumper)
1183	Q25R1		AA (jumper)
1397	Q29R1		AA (jumper)
1717	Q33L2		AA (jumper)
1931	Q29L2		AA (jumper)
2145	Q25L2		AA (jumper)
2359	Q21L2		AA (jumper)
2573	Q17L2		AA (jumper)
2786	Q13L2		AA (jumper)
2984	Q9L2		DS
3075	L2		DFBAC
3087	Q6L2		BA module
3167	Q5L2		DFBMC
3189	Q4D2L2		DFBMA
3275	L2		DFBXC



6.2 Sensitive areas in Sector 2-3

(table will be supplied in a future version of the document)

6.3 Sensitive areas in Sector 3-4

(table will be supplied in a future version of the document)

6.4 Sensitive areas in Sector 4-5

(table will be supplied in a future version of the document)

6.5 Sensitive areas in Sector 5-6

(table will be supplied in a future version of the document)



6.6 Sensitive Areas in Sector 6-7

DCUM (LHC Coordinate)	Closest magnet - Subsector	Equipment identification
16831	Q4R6	DFBMM_4
16868	Q5R6	DFBMM_5
16922	R6	DFBAL
17043	Q10R6	BA module
17203	Q13R6	AA module (jumper)
17416	Q17R6	AA module (jumper)
17630	Q21R6	AA module (jumper)
17844	Q25R6	AA module (jumper)
18058	Q29R6	AA module (jumper)
18379	Q33L7	AA module (jumper)
18592	Q29L7	AA module (jumper)
18806	Q25L7	AA module (jumper)
19020	Q21L7	AA module (jumper)
19234	Q17L7	AA module (jumper)
19448	Q13L7	AA module (jumper)
19646	Q9L7	BA Module
19741	L7	DFBAM
19761	Q6L7	EA- and ID module



6.7 Sensitive Areas in Sector 7-8

(table will be supplied in a future version of the document)

6.8 Sensitive Areas in Sector 8-1

DCUM (LHC Coordinate)	Closest magnet	Equipment identification
23371	R8	DFBXH
23459	D2Q4R8	DFBMB
23480	Q5R8	DFBMI
23562	Q6R8	DFBMJ
23575	R8	DFBAP
23667	Q9R8	DS
23867	Q13R8	AA module (jumper)
24081	Q17R8	AA module (jumper)
24295	Q21R8	AA module (jumper)
24509	Q25R8	AA module (jumper)
24723	Q29R8	AA module (jumper)
25043	Q33L1	AA module (jumper)
25257	Q29L1	AA module (jumper)
25471	Q25L1	AA module (jumper)
25685	Q21L1	AA module (jumper)
25899	Q17L1	AA module (jumper)
26112	Q13L1	AA module (jumper)
26311	Q9L1	DS
26408	L1	DFBAA
26408	RR13	DFBLA
25434	Q6L1	EC
26465	Q5L1	EC
26487	Q4D2L1	FD
26604	L1	DFBXA